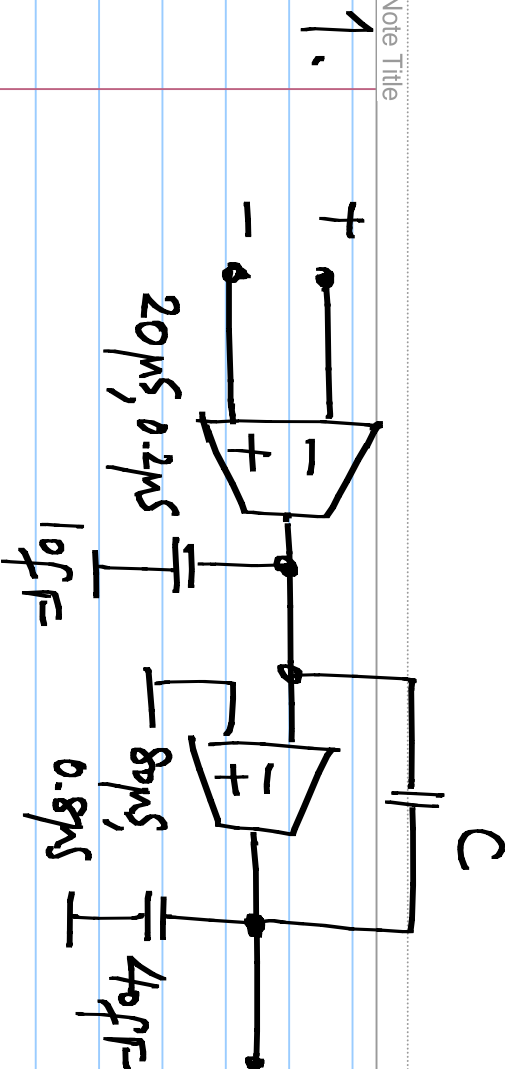EE3002: Analog circuits

EE5310: Analog electronic circuits
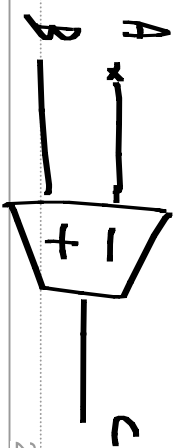
Problem set #2 (Due on 9th Oct 2015)
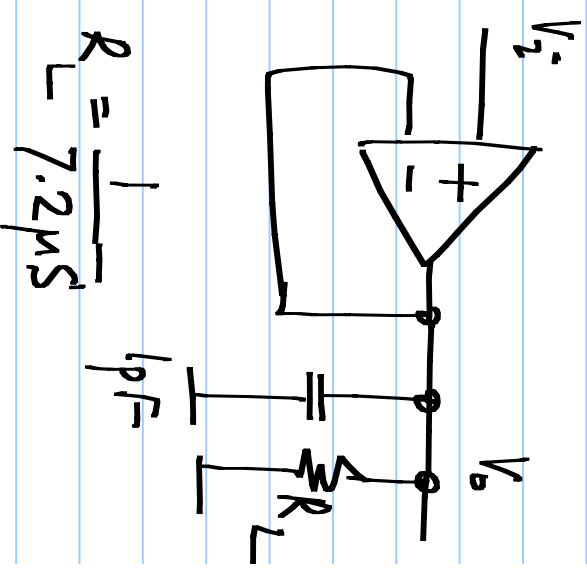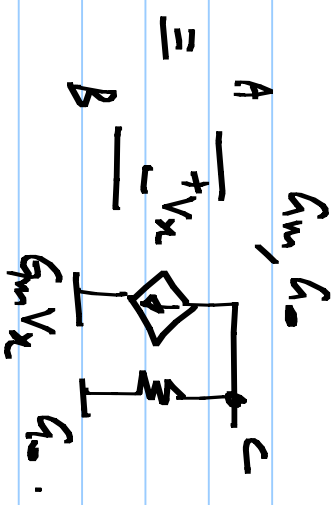
1.

+

−

20µS, 0.2µS

10fF

−8µS;
0.8µS

40fF

C

TWO STAGE OPAMP

The two stage opamp above is used
in the unity gain follower on the
right. Determine C for 60° phase
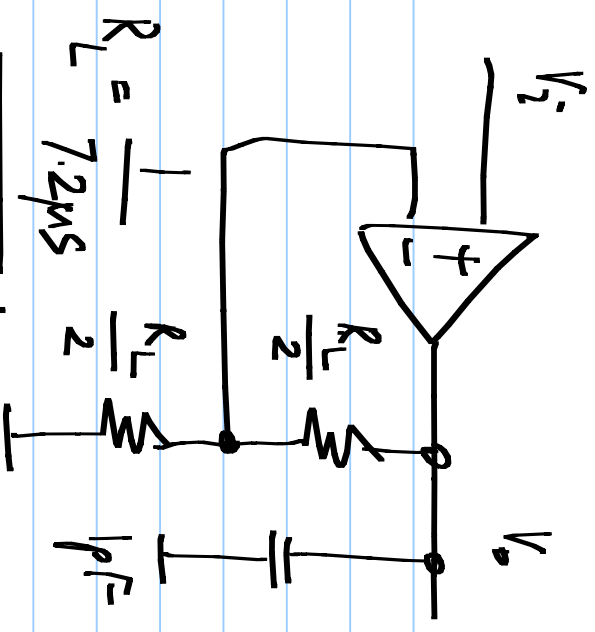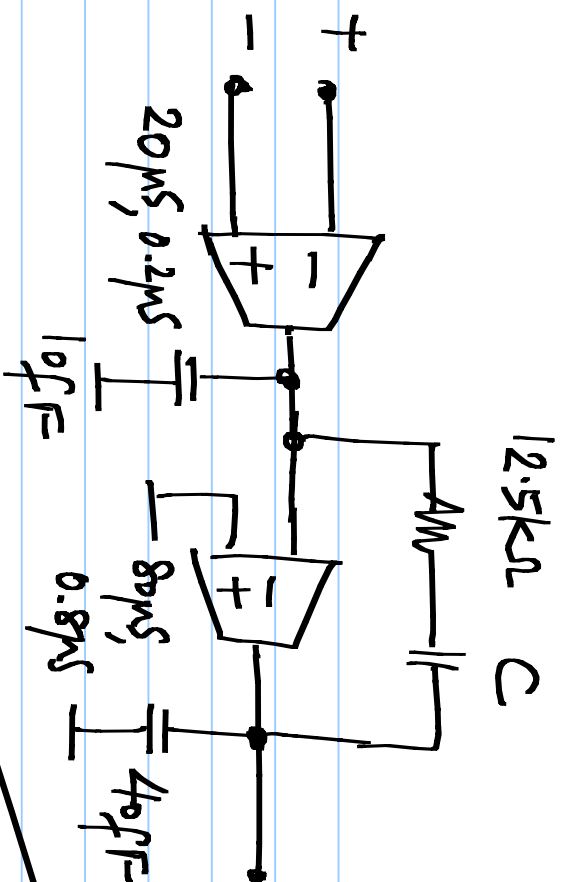margin and the resulting bandwidth
of the unity gain buffer.

A
B

C

gm, go

A

B

$+V_x$

$g_m V_x$, g_o.

V_2

V_o

$R = \frac{1}{7.2µS}$

R_L

1pF

2. The two stage opamp above is

used (as is) in the 2x amplifier on

the right. What is the phase

margin of the loop and the

closed loop bandwidth of the amplifier?

V_i

V_o

$\dfrac{R_L}{2}$

$R_L = \dfrac{1}{7.2\mu S}$ $\dfrac{R_L}{2}$

$1 pF$

_____

3. If you are allowed to change "C" in the opamp in the

above problem, what value would you use to get 60° phase

margin? What is the bandwidth of the 2x amplifier in this

case?

4

+

—

12.5kΩ C

20nS, 0.2nS

10pF

80nS, 0.8nS

8pF

40fF

$+$ 1

$+$ 1

Analyze this!

A zero cancelling resistor is used in series with the integrating capacitor. Repeat prob #1 for this case.

5. Repeat prob #3 with the opamp above

6. In each of the above cases, you would have used
some approximations. In each case, with the
value of "C" that you used, determine
the exact closed loop transfer function and
determine the closed loop poles and zeros.
You can use a numerical solver to determine
these if necessary.